EXIT PRESENTATION

Angela Diaz, Juan Ruiz and Peter Vu
Pre-Collegiate Interns in ER4
Summer 2010

Overview

- Background Information
- INSPIRE
- Our Mission at NASA as Interns
- Tasks and Projects
- Skills Acquired and Lessons Learned
- Memorable Experiences
- Future Plans
- Acknowledgements

Background of Angela Diaz

Raised in Houston, Texas

Galena Park High School
Galena Park, TX
Magna Cum Laude Graduate

Team 1429, Team KAOS
President and Chairman's leader

Community Service
- National Honor Society
- Interact

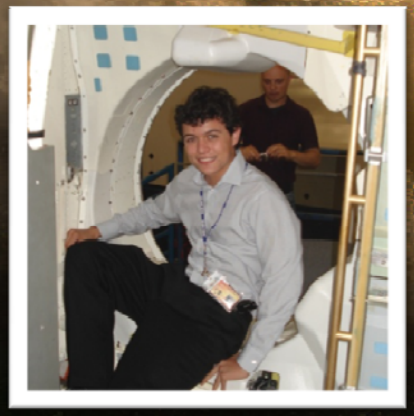
NASA JSC (Summer 2010)
CSA Pre-collegiate Intern
in ER4

Background of Juan Ruiz

Born in Midland, Michigan

Cinco Ranch High School
Katy, Texas
High Honors Graduate

CRHS Wind Ensemble
Trumpet - Jazz, Concert, and Marching



Team 624, Cryptonite Robotics
Manipulation Team and Sponsorship

NASA High School Aerospace Scholar (Summer 2009)
Mission Integration (Grey Team)
Systems Manager

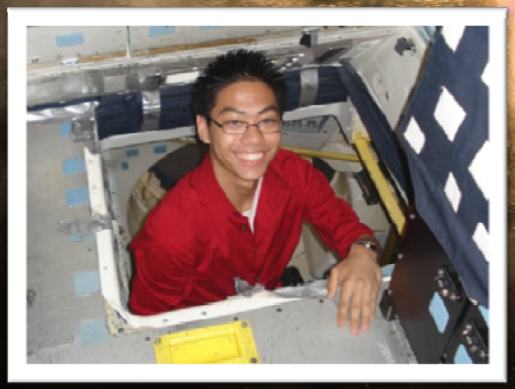
NASA JSC (Summer 2010)
INSPIRE Pre-collegiate Intern in ER4

Background of Peter Vu

Raised in League City, Texas

Clear Springs High School
League City, TX
Summa Cum Laude Graduate

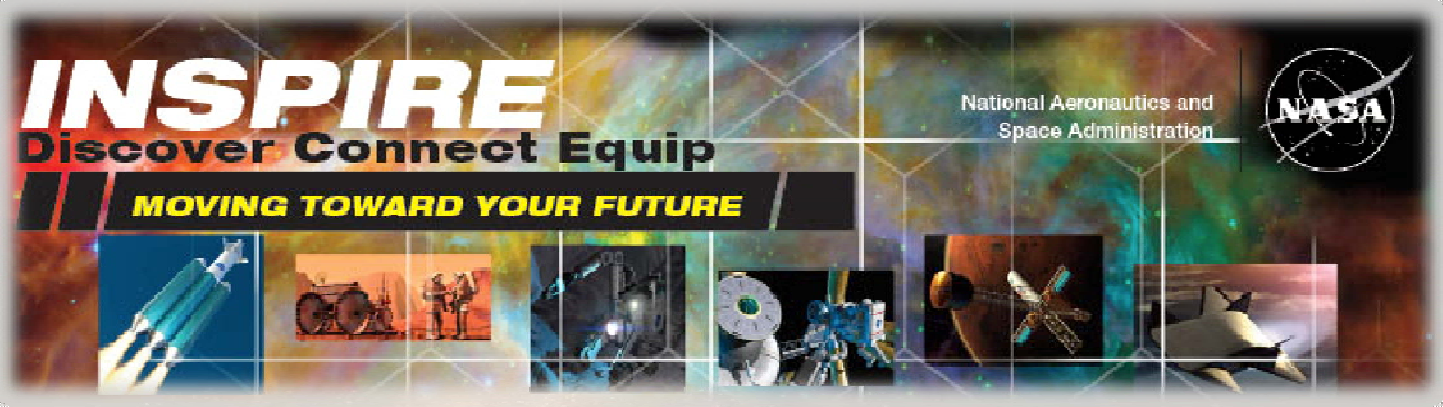
CSHS Wind Ensemble
Tenor Trombone – Concert and Marching



Team 118, the Robonauts
Controls Sub-system Lead and Scouting Captain

NASA JSC (Summer 2009)
INSPIRE Residential Intern in FITO and Education

NASA JSC (Summer 2010)
INSPIRE Pre-collegiate Intern in ER4



- **I**nterdisciplinary
- **N**ational
- **S**cience
- **P**roject
- **I**ncorporating
- **R**esearch and
- **E**ducation Experience

- Online Learning Community
  - All-year round
  - Live Chats/Discussion
  - STEM activities
- Summer STEM Experience
  - 8 week internship for rising seniors and college freshmen

Our Mission at NASA as Interns

- To aid NASA engineers in the assembly and implementation of their projects
  - By quickly and efficiently preparing tools and materials
- To allow NASA engineers to focus on priority projects
  - By fulfilling projects and tasks that expedite mission preparation
- To gain insight and exposure into the engineering field and NASA's mission

R2 Fastener Documentation

- Given Pro-E CAD models of the R2 arm, neck, and head assemblies
- Measured lengths, sizes, and style for all fasteners
- Done in preparation for six new R2 arms

R2 Fastener Spreadsheet

- Catalogued the size, length, style, and quantity into an Excel spreadsheet
- Created a record of each bolt with its associated characteristic, price, and order information
- Done to facilitate ordering
- Created a permanent record to aid engineers in future R2 builds

Organized R2 Arm Joint Kits

- Modified containers, labeled parts, and organized hundreds of R2 arm parts into their associated assembly kits
- Expedite the current assembly of six more arms, as well as any future arm builds

R2 Arm Joint Kits

Cabinet with Robonaut II Arm Joint Kits

Five Arm Joint Kits

Heli-coil Fun!

- Inserted M3, M5, and M8 heli-coils into over 80 R2 joint parts

Assembled Motors

- Assisted in the assembly of two motors for the R2 Arm

Altium Drawings Inventory

- Collected all wire harness Altium drawings into the Robonaut II Team Portal, an Intranet-based Knowledge and Asset Management System (IKAMS)
- Enables other groups within NASA to access these drawings to create harnesses and Printed Circuit Boards (PCBs) for NASA engineers to quickly build new R2 robots
- Creates a framework for the capture of mission critical data that is generated during the development of current and future R2 projects

Motor Testing

- Recorded Peak-to-Peak current, RMS current, and Hall Frequency to an Excel Spreadsheet
- Ensure that motors were reliable
- Ensure consistency
- Encounter potential problems to prevent them from happening during flight

Motor Analysis

- Constructed and analyzed P-P current, RMS current, Back EMF graphs
- Create a visual for data that was collected during motor testing
- Efficient way to view anomalies in the data

Cabinet Organization

Harmonic Drives

Encoders and APS

How NASA Benefits

Assembling R2 components

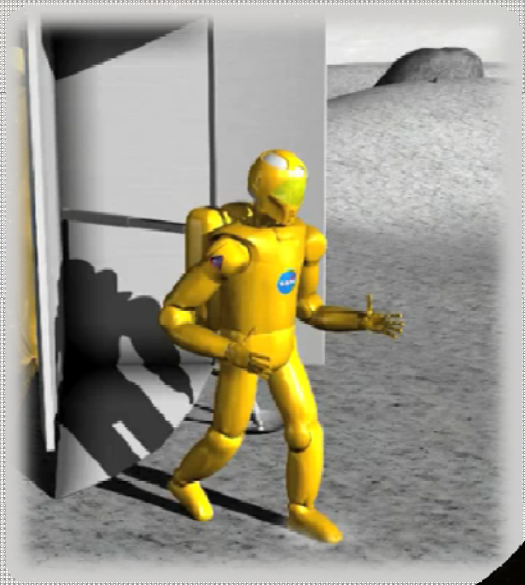
- Kits organized by joint
- Individual specialized cabinets organized by component
- Inventory and location within OASIS database.

Expandable Organizational System (EOS)

- Adjustable magnets and dividers
- Accurate labels and barcodes
- Increased cabinet space
- Sets precedent for future use in ER Division

Tool Storage

- Efficient Color Coding System (CCS)
- Tools arranged by size and use



Robonaut II Team Portal Electronic Components Database and Inventory System

- Received and inventoried massive amounts of electronic components into the newly created database
- Created and extracted Bill of Materials reports and entered them in the Team Portal to form “kit lists”
- Aid NASA to effectively search for and keep track of all components and cross reference essential parts to current inventory levels
- Enables NASA to quickly order, process, and deliver kits to external vendors to build PCBs and assemblies

Angela's Future Plans

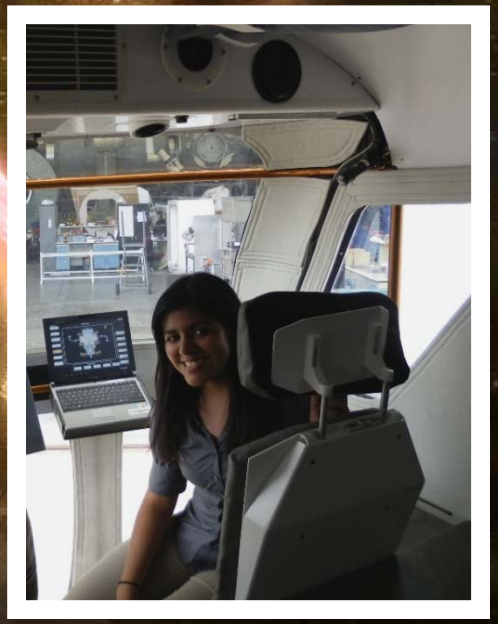
Texas A&M University-College Station
Electrical Engineering

NASA
Co-op/USRP Intern

General Electric
Intern Sophomore Year

NASA JSC or GE
Engineer and Robotics mentor

- **Robotics Mentor**
- **Start FIRST Robotics Team**
- **Aggie Rotaract**



Juan's Future Plans

The University of Texas at Austin
Aerospace Engineering

NASA or Private Industry
Co-op/USRP Intern at JSC
SpaceX, Boeing

NASA Astronaut Corps

Microgravity University
Reduced Gravity Education Flight Program and Microgravity Research

Graduate School
MIT or Caltech

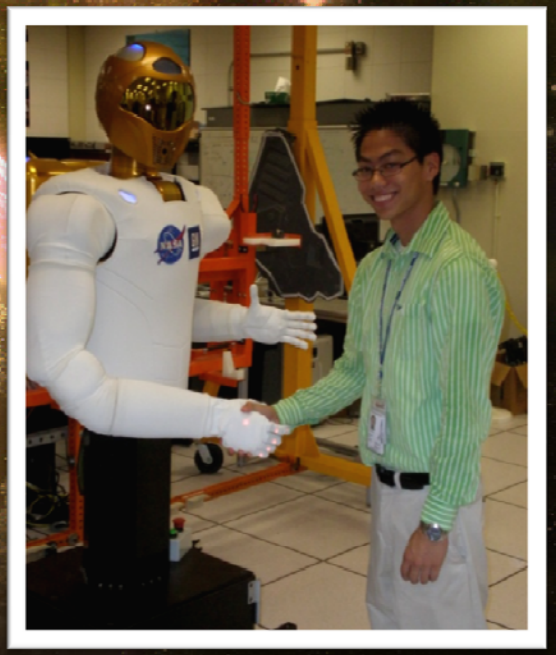
Peter's Future Plans

The University of Texas at Austin
Electrical Engineering

NASA JSC or JPL
Co-op/USRP Intern

NASA JSC or JPL
Electrical Engineer in Robotics

- **Longhorn Band**
- **Robotics Associations**
- **Intramural Ultimate Frisbee**
- **Zero Gravity Team**



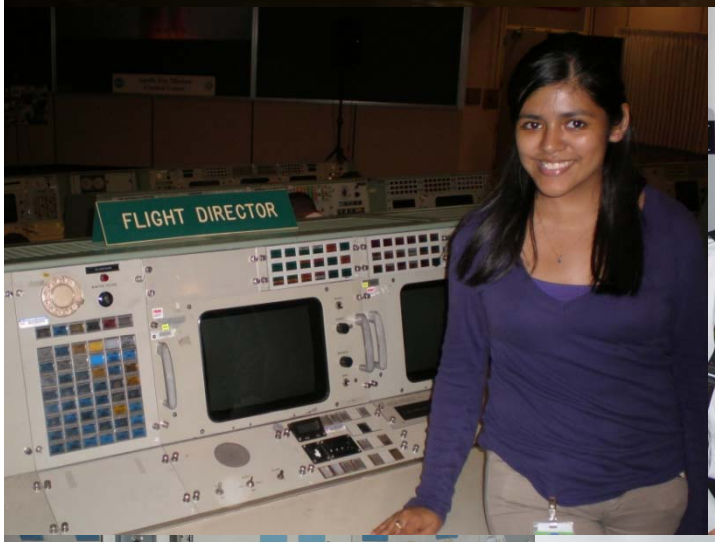
Skills Acquired

- Using Pro-E
- Heli-coiling manufactured parts
- Understanding the manufacturing process
- Understanding the anodization process
- Understanding robotic and humanoid design concepts
- Capturing information and enabling collaboration in NASA's OASIS System (MS Sharepoint 2007)

Lessons Learned

- Communication via e-mail
- Collaborating as a team
- Be proactive!
- Don’t assume, ask questions
- Time management
- Gracious Professionalism™

Memorable Experiences



Acknowledgements

Thank you to everyone who made this summer experience unforgettable! We will carry the skills and lessons we have learned throughout the rest of our lives and careers. We hope to see you in the future.